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ABSTRACT

A study asked how the use of the Reading Classroom Explorer (RCE)--a hypermedia learning environment that features video clips of successful teachers teaching reading to a diverse array of students--influences beginning teachers' thinking about reading issues. The context of the study was a reading education course which included use of RCE. Various kinds of information were gathered on 14 participants (all post-BA students), including course papers, interviews, surveys, and videotaped RCE work sessions. The statements in course papers were analyzed to identify claims, questions, interpretations, and summaries in relation to RCE content. Participants were clustered into three groups, reflecting the degree to which they used RCE in their course papers: investors (high use of RCE, even when not required in an assignment); compliers (use of RCE when required to do so for an assignment); and resisters (low use of RCE). Results indicated that involvement in an interactive learning environment such as RCE increases beginning teachers' awareness of multiple perspectives and approaches to teaching reading; but that the long-term impact on these teachers' classroom practice has yet to be established. Further studies should address this question and others--most specifically, the effects of opportunities such as RCE during the first few years of teaching. (Contains 11 references and 6 tables of data; appendixes contain paper assignments and the classification scheme.) (RS)

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ED 429 277

CIERA REPORT

The Role of Hypermedia Cases on Preservice Teachers' Views of Reading Instruction

Joan E. Hughes, Becky Wai-Ling Packard, and P. David Pearson
Michigan State University

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CIERA Inquiry 3: Policy and Profession
How can new teachers be initiated into the profession and provided with the knowledge and dispositions to teach young children to read well? Can hypermedia learning environments such as Reading Classroom Explorer facilitate this process?

In this paper, Hughes, Packard, and Pearson ask how the use of Reading Classroom Explorer (a hypermedia learning environment which they developed) influences beginning teachers' thinking about reading issues. Students' course papers were analyzed, statement by statement, to identify claims, questions, interpretations, and summaries in relation to RCE content. Participants were clustered into three groups, reflecting the degree to which they used RCE in their course papers: investors (high referral to RCE, even when not required in an assignment); compliers (referral to RCE when required to do so for an assignment); and resisters (low or even negative referral to RCE).

The course papers were evidence, Hughes et al. argue, that involvement in an interactive learning environment such as RCE increases beginning teachers' awareness of multiple perspectives and approaches to teaching reading. However, Hughes et al. caution that the long-term impact on these teachers' classroom practice has yet to be established.

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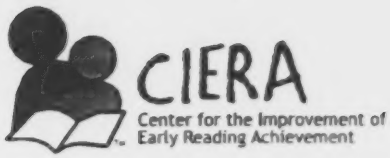

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The Role of Hypermedia Cases on Preservice Teachers' Views of Reading Instruction

Joan E. Hughes, Becky Wai-Ling Packard, and P. David Pearson
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In recent years, we have seen an increasing call for the use of "cases" in teacher education as a way of helping students come to grips with the complexities and situated character of teaching (e.g., Sykes & Bird, 1992; Shulman, 1992). Even more recently, we have witnessed the call for and the development of hypermedia instantiations of case-based teacher education (e.g., Lampert, Heaton, & Ball, 1994; Kinzer & Risko, 1998) as a way of rendering case-based instruction more viable for teacher educators and novice teachers in preservice methods classes. The current study is grounded in both of these movements. Using an existing set of video cases from the Center for the Study of Reading's video series, "Teaching Reading: Strategies from Successful Classrooms," we developed Reading Classroom Explorer (RCE), a hypermedia learning environment designed to help novices understand that there are many successful tools and approaches available to engage students from diverse cultural, linguistic, and intellectual backgrounds in challenging literacy curricula. The footage in RCE shows these successful teachers engaged in the process of teaching reading in different ways to this diverse array of students in several sites around the United States: Honolulu, HI; Danville, IL; New York, NY (Harlem); San Antonio, TX; Lansing, MI; and Media, PA. RCE is a searchable (by school, broad theme, and/or keyword) database of digitized video clips from the video series. Users are able to watch videos, read transcripts, read questions based on content, and make notes in an interactive notebook.

In an earlier study (Hughes, Packard, & Pearson, 1997), we explored participants' views of RCE as a learning environment. The results of our inquiry indicated that participants held diverse views about RCE's purpose as a learning environment and discovered an interesting, if wide-ranging, set of approaches for navigating our hypermedia environment. In the spring of 1997, intrigued and encouraged by our preliminary research, we began investigating the integrated and complementary use of RCE in a semester-long methods course. Specifically, we wanted to know how RCE might enhance the learning of preservice teacher education students as they prepared to assume internships.

Because RCE is derived from an existing "set" of instructional materials, completely edited with visuals and voice-overs, there is a tendency to think of it as a "prepackaged" set of cases, and in one sense it is. The cases meet Shulman's standard of constituting "concrete human images of activities and values worthy of emulation" (Shulman, 1992, p. 8) and may even "induce change in the direction of the exemplar" (Sykes & Bird, 1992, p. 494,). Unfortunately, as Sykes & Bird (1992) indicate, often we are relegated to using video and narrative cases as examples to support reform-oriented methods instruction. Sykes and Bird explain:

> Most obviously, if teacher educators hold transformative aims and seek to promote new instructional practices and social ideas that are not widely available for observation in schools, then cases might constitute one bridge between hortatory pronouncements and new practices and attitudes. Video cases, in particular, may have value in presenting vivid, concrete images of desirable instructional practices that may help change the minds of prospective teachers. (p. 494)

Other researchers have examined the use of video cases and hypermedia on teacher learning. Bransford et al. (1989) and Kinzer & Risko (1998) found that their use of video resources in teacher preparation programs provided a context-rich anchor which students and instructors used as models for teaching and from which they drew examples and explications; the use of these resources also encouraged students to ask more high-level questions, become more flexible in their analysis and application of teaching methods, and retain more vivid recollections of the video content. While there may be many benefits from using video resources in classrooms, there also may be pitfalls, depending on how the resources are assembled, displayed, and used.

There is a danger when few cases are used, for students are led to view case content as a prescriptive, rather than exemplary, set of possibilities (Shulman, 1992). This is particularly dangerous in ill-structured domains, such as medicine, literary criticism, law (Spiro & Jehng, 1990), and teaching (Shulman, 1992), which are characterized by increasing content complexity and irregularity in applying knowledge across cases. In examining three ill-structured domains (medicine, literary criticism, and law), Spiro (reported in Shulman, 1992, p. 26) found that instructors who used single case examples "permitted single representations to reign unchallenged." We share Shulman's opinion that teaching truly qualifies as an ill-structured domain; thus our emphasis on promoting multiple teacher cases in RCE.

However, when these cases are transformed into RCE, they acquire an additional attribute that a video environment does not possess: The cases can be navigated with a highly ..exible set of search engines that allow users to find clips that share a common theme or to pinpoint specific incidents or examples encountered in and across the videos. RCE's hypermedia structure guards against this pitfall of prescriptive case use. The six sites serve as multiple teaching cases for students to compare and contrast. Like the use of commentary, which Shulman (1992) identifies as a "layer which provides an additional lens to view the events of the case" (p. 12), the video contains a researcher-based interview and the teachers' own commentary on their practice, and the program provides content-based questions to ponder and

research articles to consult. In this way, students are provided supports to use multiple lenses to analyze and critique the cases.

RCE can also be viewed as a window through which students' emerging teaching philosophies are influenced. During preservice education, preservice teachers define teaching, become aware of and assess their assumptions about teaching, and develop personal philosophies to guide them through their field work, internship experiences, and future teaching positions. Cultural-historical theory views "the development of mind [as] the interweaving of biological development of the human body and the appropriation of the cultural/ideal/material heritage which exists in the present to coordinate people with each other and the physical world" (Cole & Wertsch, 1996, p. 251). That heritage or culture is "the accumulated products of prior generations" (p. 250); for preservice teachers this heritage is likely to be constructed from the co-mingling of many sources—the teaching philosophies of instructors and collaborating teachers, ideas from the texts they read, reactions to field experiences, and recollections of their own experiences as learners. In other words, these preservice teachers are learning and developing through interactions with others, texts, and experiences that both constitute and are constituted by the culture they are adopting as teachers.

We examined the impact of RCE use on students' reasoning, specifically upon the ways in which they are able to use evidence to support claims about teaching reading in their course papers. We anticipated that students would use RCE to varying degrees because RCE was only required for one of three paper assignments. Indeed, students' use varied, and we sought to examine a possible relationship between levels of use and their thinking in course papers. This sets up a natural comparison opportunity. We could compare those students who elected to use RCE often with those who chose not to. While we acknowledge that other factors may differentiate these students' use of RCE (e.g., motivation to learn, ability, comfort with technology, etc.), we still wanted to gain insight into the effect of RCE on their reasoning. Therefore, our research questions were:

- Does the extent of RCE use impact students' thinking about literacy issues?
- Does use of RCE contribute to a restructuring of users' thinking and reasoning activities?

Methods

Participants

The participants were post-BA (already held a bachelor's degree) students in a teacher education methods course. Fourteen of the twenty-eight students consented to participate in our research project. They ranged in age from mid-twenties to mid-forties. A majority of participants were Euro-

American women. Students had diverse career backgrounds before entering the program.

RCE Training Session

In a training session, the first two authors demonstrated RCE after which students practiced using the various functions. We also provided a user's manual and made ourselves available through e-mail and phone to answer questions.

Context of Use

Students used RCE as one source among a number of possible sources they were encouraged to draw upon in the course, including (but not limited to) classroom observations, readings, personal experiences, past careers, and video exemplars. Three paper assignments were central to the course, comparing the use of whole language and skills orientations to teaching reading, management and use of different grouping arrangements (small group, whole class, and individual instruction), and the awareness and impact of diverse learners on teaching and learning. (See Appendix A for assignments). The second assignment required the use of RCE; RCE's use was optional in the first and third assignment. Assignments could be completed individually or in pairs.

Data Collection and Analysis

Data sources.

There were a variety of data sources. We collected (a) three paper assignments; (b) interviews that focused on reactions to the course, particularly the media component; (c) a follow-up interview in early fall of 1997 focusing on technology learning and current thoughts about RCE in the internship year; (d) videotaped work sessions during which participants worked on the second paper using RCE, using a think-aloud method (Afflerbach & Johnston, 1986); and (e) several surveys that provided information about students technology and professional backgrounds and their reactions to the hypermedia. Participation in this research study was voluntary. Those students who did choose to participate participated to varying degrees. All participants provided copies of their course papers. These papers, in our estimation, approximated most closely participants' thoughts about literacy issues because the assignment asked them to reflect on literacy issues. In addition, each decided what combination of interviews, surveys, and videotaped working sessions they would provide. We used this data to triangulate emerging themes from the paper analysis.

Coding rubric.

In our analysis for this project, we focused primarily on the three course papers to understand how using RCE impacted participants' use of evidence in their reasoning. We examined the course papers at a very detailed level.

We first read a subset of the papers to gain a sense of the argument structures and flow, and on the basis of these impressions, created a rubric that would allow us to characterize the ways in which the students crafted arguments and used evidence to support their perspectives (see Appendix B for coding rubric). In this context, we used these course papers as a way to examine the students' beliefs and thinking about literacy. We also use the aforementioned data sources to support the claims we make based on the paper analysis.

Our coding rubric classifies each statement at a propositional level, identifying claims, questions, interpretations, summaries, evidence, and sources of evidence. Students made ***claims*** when they asserted a position about an issue, raised ***questions*** about literacy and teaching issues, ***interpreted*** when they made inferences about topics or applied new insights to other situations, and ***summarized*** content by reiterating their arguments. We read several papers individually and collaboratively to code statements. We were careful to code the statements as they fit in the context with other statements. That is, we tried to understand at a contextual level, where multiple sentences could represent one claim or one piece of evidence. We were most interested in the structure of and patterns across the arguments presented in the papers. Therefore, we then coded argument chunks, various combinations of claims and evidence, such as Claim-Evidence and Claim-Evidence-Interpretation (see Appendix B for further description of the coding process and codes).

Two of the researchers independently read a 10% random sample of the papers and coded argument chunks. Ninety-one percent inter-rater reliability was reached, and discussions resolved any disagreements between scorers.

Results

We tracked the extent to which students used RCE as a resource in their learning. From this, we developed metaphorical category labels to characterize this difference in their level of use. We used the emerging patterns as a starting point to discuss similarities and differences between participants. They were "investors", "compliers", and "resisters". Rather than reporting about all the participants, we chose two case studies for each category. These cases are representative in terms of level of use.

Once we identified participants' levels of use, we constructed a case through examining how students made arguments and used evidence to support those arguments about a literacy issue in their papers. We then used interviews, surveys, and videotaped work to support or refute our developing findings. We chose to introduce those students for whom we were able to construct the most fully-developed cases. These cases are not representative of all students in each category; they are, however, the most interesting and fully-developed case studies of students using RCE. We feel that the presentation of these participant-cases will help us to think about the important

issues surrounding the use of RCE in preservice education. In our Discussion section, we take up these significant issues.

Investors

We liken five of the students who worked with RCE to investors—those who utilize opportunities for future advantage. Investment is seen through their avid and extended use of RCE for each paper assignment. We present Barbara and Ruth as examples of investors. Each demonstrated excitement about their collaborative inquiries using RCE. However, the ways in which each utilized RCE for their future advantage differs, as seen through their paper assignments and videotaped Explorer work sessions.

Barbara: Seeking to understand more.

Barbara's work with RCE, her papers, and her interviews indicate that she is a preservice candidate who seeks to better understand teaching and student learning. Barbara and Ruth used RCE together as they got ready to write their second papers. In preparation, they spent time questioning the teaching and learning that they observed in the video clips. During these moments, Barbara and Ruth seem more involved in the discussion, which is indicated by their discourse lacking pauses (latching talk), details, and narrative, and the many instances of overlapping talk containing repeated words, such as "yeah" and "OK" (all elements of engagement described in Tannen, 1989). These conversations often became tangential to the course paper assignment on hand. However, in an interview, Barbara identified and highlighted the importance of these discussions, what she termed "blahing":

> Another thing is this whole process of going through this assignment gives the opportunity to, the time spent sitting and watching clips, I just noticed that we had a couple conversations that were like you know . . . talking about the book club . . . things that didn't really have anything to do with the assignment, but it was very, it was just, it was outside of class, but we were still talking about teaching and ideas. I just think that was, especially last year when we are really new to this program and teaching classes, we really needed time to just BLAH about all this stuff that was going on. You know you get all these ideas going on and it's really nice to sit and talk outside of class about whatever comes to mind. (Barbara, 5/97)

Barbara uses RCE as a site to learn more about teaching and learning. These conversations help her learn more about a topic by asking questions and discussing it with another person, Ruth.

Another way to examine Barbara's views about learning is to examine her use of argument chunks. Barbara balanced claiming, interpreting, and claiming with evidence across all three papers (See Table 1). Use of interpretive thought units (CI or CEI) throughout her papers indicates that Barbara not only used information from her cultural repertoire to make claims, but she also reflected on these topics by interpreting such claims in more depth.

This interpretive and reflective stance and willingness to consider other views also becomes clear in Barbara's papers. In her first paper, she indicated that her current understanding of a topic had been changed with use

Table 1: Barbara's Argument Chunks & Evidence Across Papers*

Argument Chunks	Paper 1	Paper 2	Paper 3
Naked Claims (AC, CS)	25%	18%	25%
Claim With Evidence (CE, CES)	37%	27%	49%
Claim With Interpret (CEI, CI)	25%	45%	25%
All Evidence (AE)	0%	0%	0%
Total Argument Chunks	8	11	8
Total Number of Evidence	5	15	8
Number of Video Emphasis	3	15	6

* Note: See Appendix B for argument chunk descriptions and abbreviations.

of RCE: "When first thinking about this problem, I had a strong opinion about how to rank the effectiveness of whole-class, small group, and independent work. . . After viewing several hypermedia clips, however, I have altered my opinion. . . ." (Barbara, Paper 1). Similarly, in her last paper, she indicated how her views had changed: ". . . viewing these videos has definitely had an impact on my ideas about teaching reading and writing. At the start of the semester, I was pretty much set on the idea of using only whole language teaching techniques. . . After seeing the variety of teaching styles in these videos, however, I have come to realize that good teaching comes in many forms. . . ." It appears that RCE provided opportunities for Barbara to consider new perspectives and learn more about teaching and learning.

Ruth: Affirming what she already knows.

While Barbara looks to consider and reconsider issues, Ruth possesses a very different agenda when working with RCE and completing these course paper assignments. Ruth engages with Barbara around many issues that emanate from the video clips they watch. However, Ruth is keenly aware of their primary purpose for using RCE: to gather information for her paper assignment. For example, Ruth identified and explained this tension between what Barbara calls "blahing" and Ruth's need to prepare for writing the paper:

> Part of the reason I wanted to jump around, part of the reason I'd go back and see things is because I was just interested in them for their own sake, not because it would help me with the paper. But then we'd do this thing where we'd stop and say what are we doing, we've got to get this thing turned in. . . (Ruth, 5/97)

It is interesting that Ruth believes that "*we'd* do this thing where *we'd* stop and say what are *we* doing, *we've* got to get this thing turned in" (emphasis added) because the video-taped work session indicates that Ruth alone identified that they were off the paper topic and attempted to reposition their talk. This pattern of interaction became apparent during the videotaped work session. First, Ruth, through action and words, controlled the discussion. She continuously made "move-on" moves, characterized by statements such as "done with this?"; "can we go on?"; "should I go to the search screen?" and mouse actions (changing screens, clicking on new clip choices) which changed the topics of conversations. Often Barbara's discussion or line of inquiry was interrupted by Ruth's actions. Following is a brief excerpt of the work session during which Ruth repositioned the direction of their discussion and work by making several move-on moves.

Barbara	Well, I am just trying to think of how, how I would talk about this particular clip cause I, I don't really, I don't see that as part of these three categories
Ruth	Uh, huh
Barbara	except for maybe prior knowledge but, I don't know, not, not really [Ruth moves to Search Screen]
Ruth	Oh, see I think it is part of the literacy thing. What do you call it? [rustling through papers] liter [Ruth peruses search results]
Barbara	literature?
Ruth	Literature. But maybe not, um, I don't know
Barbara	I think of literature as like books written for [unintelligible]
Ruth	I understand. Would you like to see Book Club then? [clicks on Book Club, Harlem clip to view]
Barbara	I mean for r:e:a:ding instructio*n I don't know* [italicized part, spoken very, very softly]
Ruth	I don't know. To me the easiest way is to just go though these really fast, and if one, I think one of them fits then we'll jot it down. I mean, I don't think we need to sit here and try and force it to fit. [clip starts playing—Book Club, Harlem]

In this excerpt, Ruth made several move-on moves which changed or stopped the direction of the discussion. On line 11, she admitted that her statement was possibly incorrect when she said, "but maybe not, um, I don't know." Ruth tended to make these types of statements when she attempted to interpret or extend some issue, often when Barbara began asking her probing questions. When that attempt failed (Barbara continued to explain her point of view), Ruth made another move-on move (Line 13) by explicitly asking if Barbara wanted to see another clip. When Barbara did not answer Ruth, Ruth (Line 17) ended that line of inquiry and began discussing Explorer research tactics while choosing a new clip to play. That new clip moved the discussion to other issues.

Ruth was aware of this tendency to use move-on moves to keep the discussion close to the issues in their course assignment. In an interview, she explained:

> I don't know why Barbara wanted to keep working with me. Because I'd just get impatient and go onto something else when she'd still be looking at something. I guess because we worked on all three of them together, I guess she liked doing it too. Maybe, because we are friends, she didn't feel like she could say no. No, she wants to really think things through and I just want to say, "I don't know why we are here, let's just move." I don't know why she put up with it but I think on one of the other videos, she had the control (mouse). We took turns. We tried to take turns with control of the mouse. (Ruth, 5/97)

Ruth's cursory awareness of and interest in the issues presented in the videos and discussion may have contributed to affirmation of ideas and beliefs she already held instead of generating thoughtful reflection of new issues in teaching and learning. Table 2 shows Ruth's declining use of claims with interpretation and increasing use of naked claims in her written papers over the semester.

Table 2: Ruth's Argument Chunks & Evidence Across Papers*

Argument Chunks	Paper 1	Paper 2	Paper 3
Naked Claims (AC, CS)	14%	33%	60%
Claim With Evidence (CE, CES)	38%	44%	40%
Claim With Interpret (CEI, CI)	37%	11%	0%
All Evidence (AE)	0%	0%	0%
Total Argument Chunks	7	9	10
Total Number of Evidence	6	12	15
Number of Video Emphasis	3	11	13

* Note: See Appendix B for argument chunk descriptions and abbreviations.

In addition to the trends among her argument chunks, comments in Ruth's papers indicate that she seeks to affirm her own beliefs and collect new ideas rather than reflect on and interpret issues of teaching and learning. She explained how the video clips helped her affirm her own perspective: "I'm not sure if viewing these videos has so much changed my perspective as clarified it and supported it. Many of the things I saw touched something inside me that said, 'yes, that's what I believe, that's what I want to do,' but I needed help formulating those ideas more clearly" (Ruth, Paper 3), and later in her third paper, she stated: "Overall I would say that viewing these videos didn't change my overall perspective on teaching reading and writing, but did give me a deeper understanding of what I believe about teaching and learning, how to explain that to others, and what kinds of lessons and environment I can create based on these understandings." Again, the video clips helped her get a sense of what this teaching looks like: "Filling my room with literature was also an idea at the back of my mind which these videos helped to make more concrete."

Compliers

Seven participants used RCE as a resource *only* when required for the second assignment. We saw them as "compliers", for they used RCE only because it was required. Even though compliers did not use RCE as avidly as the investors, they derived benefits from using RCE. We share Nina's and Jack's experiences using RCE as examples of compliers' work.

Nina: Seeking information to fill in the gaps in her knowledge of teaching reading.

Nina uses RCE to help her learn more about teaching reading, filling in the gaps created by a lack of opportunity to learn from her collaborating teacher (CT). Nina explained:

> By viewing the hypermedia, I have increased my knowledge on various methods of teaching reading and writing. It was an especially beneficial experience for me because of the little reading that I am able to observe in my CT's classroom. I believe viewing the teachers on hypermedia has made me more aware of the many methods to teach reading and writing. (Nina, Paper 3)

Thus, with use of RCE, Nina gains valuable information about teaching reading, which is unavailable in other contexts.

Nina was also interpretive and reflective in her papers (see Table 3). Her Naked Claim proportion decreased, she maintained her Interpretive proportion throughout, and the number of evidence used to support claims increased. Over time, she used more evidence and interpretation to accompany her claims.

Table 3: Nina's Argument Chunks & Evidence Across Papers*

Argument Chunks	Paper 1	Paper 2	Paper 3
Naked Claims (AC, CS)	50%	24%	29%
Claim With Evidence (CE, CES)	19%	28%	36%
Claim With Interpret (CEI, CI)	19%	28%	21%
All Evidence (AE)	12%	8%	7%
Total Argument Chunks	16	25	14
Total Number of Evidence	9	13	12
Number of Video Emphasis	6	10	10

* Note: See Appendix B for argument chunk descriptions and abbreviations.

Nina's videotaped RCE work session supports her interpretive stance. After watching clips, Nina interpreted the content. For example, after viewing a San Antonio, Texas clip in which students read different texts, Nina said, "Students feel successful. Choice is important." Nina took the time to puzzle over issues that she found intriguing and took steps to analyze video clip content. Nina used RCE to help her fill in the gaps.

Jack: Affirming his views on teaching or a case of missed opportunities?

Jack's first and third papers had a large proportion of Naked Claims (see Table 4). His tendency to make claims about teaching may suggest that he is using RCE to affirm his views of teaching rather than interpret and examine methods of teaching. However, when Jack used RCE for his second paper, he used more evidence, alone and to support claims, and fewer Naked Claims.

Table 4: Jack's Argument Chunks & Evidence Across Papers*

Argument Chunks	Paper 1	Paper 2	Paper 3
Naked Claims (AC, CS)	71%	33%	67%
Claim With Evidence (CE, CES)	0%	13%	22%
Claim With Interpret (CEI, CI)	29%	27%	11%
All Evidence (AE)	0%	27%	0%
Total Argument Chunks	9	14	15
Total Number of Evidence	0	9	6
Number of Video Emphasis	0	9	5

* Note: See Appendix B for argument chunk descriptions and abbreviations.

Jack's videotaped RCE work session provided insight into his use of RCE. In his papers, he summarized clips (often nearly verbatim) to support his thesis. In the videotaped work session, we expected to see Jack summarizing clip content. We were surprised when we saw Jack asking "interpretive" questions, commenting about clips, and even reading the probing question

section in RCE. For example, in his work session, Jack said: "I don't think the reasons she gives are very powerful" (in response to a clip on Integrating Process and Content); "It doesn't seem like the same classroom—goes from prereading to Great Books"; "Interesting, how *do* they get kids to read at home?"; "I wonder why children wouldn't be cognizant that they're going to be judged on spelling at the end and so fall into the same trap." These interpretive questions and comments did not appear in his papers, nor were they answered in his videotaped work session. We suggest that Jack may be a case of a "missed opportunity"; if he had worked with a partner, he might have turned his budding reflections into substantive and dialogical inquiries.

Jack's fall interview further illustrated his regard for the RCE content and showed that he hoped for the opportunity to use RCE as a practicing teacher. He explained:

> . . . So it would be neat to be able to watch those videos, those clips, a year later when I'm in the classroom or when I have a question about something that was talked about in those classes, say oh, what did they say on that? (Jack, 9/97)

Jack pushed us to think about the role of collaboration and RCE. Discussion may help preservice teachers benefit from this technology.

Resisters

The two "resister" participants *resisted* using RCE. Even for their assignment that required use of RCE, they did not use it. In one case, the resistance was due to lack of technology experience. In the other case we could not identify the source underlying resistance: she simply chose not to use RCE.

Stella: Surface-level reporter.

Overall, Stella's papers were of low quality because they consisted primarily of "reporting" evidence, as seen in her prominent use of All Evidence argument chunks, and often lacked interpretation and coherence (see Table 5).

Table 5: Stella's Argument Chunks & Evidence Across Papers*

Argument Chunks	Paper 1	Paper 2	Paper 3
Naked Claims (AC, CS)	22%	29%	53%
Claim With Evidence (CE, CES)	56%	46%	13%
Claim With Interpret (CEI, CI)	0%	0%	13%
All Evidence (AE)	11%	21%	20%
Total Argument Chunks	7	16	12
Total Number of Evidence	6	10	14
Number of Video Emphasis	1	8	13

* Note: See Appendix B for argument chunk descriptions and abbreviations.

We liken Stella to a surface-level reporter because her comments about the classrooms she viewed are transparent, or surface-level, observations. In the following excerpt, note that she had not used RCE but had watched the full-

length video in class, as indicated by her survey after completing the first assignment. She wrote:

> In one of the video clips we watched, the teacher led a small group of students in a group discussion/problem. These were very young students who probably would have trouble working in groups. The teacher got the students excited and anxious to answer questions and discuss the problem. I was quite impressed. I believe group work should start young. (Stella, Survey (1/97)

We saw this reporting of evidence in her second paper as well. Often the evidence she reported was dangling, in the sense that it was not tied contextually to any bounding idea or theme. She wrote:

> On a more personal note, my nieces have attended a private school which emphasizes skill-based learning, especially phonics and spelling. They recently switched to the public school which uses whole language learning. They are so advanced in their reading and spelling it amazes me. My sister, their mother, teaches fourth grade. She believes that the structure they were receiving before, as far as spelling and phonics goes, has been erased. This teacher has taken whole language to the extreme. I am not criticizing the program. I simply thought it was something to think about. (Stella, Paper 2)

In addition, we were struck by the serial nature of her reporting; she did not use a cross-classroom lens. She wrote her papers in the same fashion as she had watched the videos; she recounted evidence in her paper serially. In her third paper, she demonstrated this serial stance and her continued tendency to hit on surface issues. She wrote, "The first classroom I visited was Danville. I noticed that she spoke very slowly. . . The next classroom I visited was Harlem. I loved this teacher."

We wonder if Stella's arguments would have been more pointed and her evidence more vivid and tied to claims if she had used RCE. Possibly, having a partner or having class time to use RCE would have helped Stella become invested in the technology.

Ed: Technology background contributing to missed educative opportunities?

Although Ed attempted to use RCE for his course assignments he never successfully did so. . He explained to us:

> I did go in and try to use the disk. And I wasn't terribly successful with it. I went in to use it and [laugh], like I said, never used it before, and I didn't get the cartridge or tray to . . . it got stuck in one of the computers. I went back and had one of the lab monitors to help me. I had trouble with this. I tried to use the disk two times. The first time after I got it stuck in the machine, I was more successful than the second time. (Ed, 5/97)

Even though he was not successful using RCE, Ed watched the videos in class. As you can see in Table 6, after his first paper, Ed used all video evidence in his papers. Further, over the semester Ed increasingly made claims with interpretation. This pattern of argument chunks indicate that Ed is thinking and reflecting on the teaching and learning going on in the videos. However, as opposed to Barbara or Ruth but similar to Stella, he takes a serial approach to analysis and use of evidence.

Ed's arguments remain at a school-by-school level instead of including a cross-school analysis. For example, he made a claim about the school in Harlem and used Harlem evidence. In the next paragraph, Ed made a claim about the Danville classroom with Danville evidence. Yet Ed did not interpret or reflect across issues he identified in individual schools. We question whether use of RCE might have sharpened his arguments and broadened his claims to involve more cross-school analysis. If so, by *not* using RCE, Ed may have missed an educative opportunity.

Table 6: Ed's Argument Chunks & Evidence Across Papers*

Argument Chunks	Paper 1	Paper 2	Paper 3
Naked Claims (AC, CS)	29%	38%	42%
Claim With Evidence (CE, CES)	43%	19%	16%
Claim With Interpret (CEI, CI)	14%	25%	34%
All Evidence (AE)	14%	6%	0%
Total Argument Chunks	7	16	12
Total Number of Evidence	6	8	5
Number of Video Emphasis	1	8	5

* Note: See Appendix B for argument chunk descriptions and abbreviations.

Ed learned from watching videos, yet how would his arguments have changed if he had been able to look more pointedly and specifically at cases within the hypermedia system? In an interview, he explained that the CD made him try to think across schools:

> I realized that all these videos were contained on the CD-ROM and that they formed some sort of a whole. They were all part of some sort of entity in the classroom. I think that made me think more about the different videos and try to find points of similarity between them or differences. I think the fact that I knew that they were out there on this CD-ROM added to that. I think that made me think more about the relationship between all these different classes. (Ed, 5/97)

Yet, if Ed did think and reflect across schools, it did not appear in his written work. Unfortunately, given the limited extent to which Ed used RCE, we are unable to ascertain the possibilities of RCE's effect on Ed's argument structures and beliefs about teaching and learning.

Summary

Looking across the categories and cases, we suggest that the extent to which students used RCE did impact their thinking about literacy issues. We saw that both our investors and compliers, those students who used RCE to a fair extent, analyzed across the teaching cases they viewed through RCE. In addition, they used evidence to support the claims made in their course papers. The investors took personal initiative to use RCE more in their learning; Barbara and Ruth felt it contributed to their learning and challenged their prior

beliefs about teaching reading. Resisters used a serial school-by-school analysis and less cohesive arguments.

We feel that RCE contributed to the restructuring of students' thinking and reasoning. Again, the more students accessed RCE, the more they explicitly engaged in cross-case analysis and increased their awareness of multiple perspectives and approaches to teaching. This awareness challenged their prior beliefs about teaching and learning and provided a resource upon which they drew in developing their own flexible teaching philosophies.

Discussion

The current study (i.e., Jack's and Ed's missed opportunities to discuss insightful observations of video content and Barbara and Ruth's numerous "blah" moments) has led us to question whether RCE benefits users most when used collaboratively toward a course goal. Oftentimes, technological resources are made available for check-out and used individually by students. We foresee that giving students class time to use RCE in pairs would alleviate many of the technological and time constraints our participants reported. We are currently analyzing data from another course which incorporated RCE into the course goals. Students worked in pairs and used RCE to define a question and construct a multimedia "paper" in the RCE Notebook. Our continuing research will help us better develop cutting-edge technologies in teacher education and try to understand the effect of these technologies on learning and teaching.

RCE, which provides vivid images of teachers teaching reading to diverse students, is a tool developed with the intent of influencing preservice teachers' thinking. Pea (1985) has argued that "the cognitive technologies we invent can serve as instruments of cultural redefinition (shaping who we are by changing what we do)" (p. 168). Pea rests his argument on the fact that the technological tools not only amplify human mental powers (e.g., reduce time for some processes, which provides more time for other types of thought) but also that "cognitive tools can yield orders of magnitude and thereby qualitative changes in forms of thought" (p. 169). Our study indicates that preservice teachers use the cases in RCE as an information resource, much like books they read, lectures they hear in courses, or observations they make. We observed that RCE helped clarify to students that these were exemplary cases rather than prescriptions. One pointed instance of this is the way many students initially rejected the practice of the Media, PA teacher because they felt the teaching was too phonics-based. However, after using RCE to pointedly compare cases, these same students grew to appreciate the complexity of the Media teacher's approach and the enormous library and reading emphasis in the school; they even likened elements of her practice to that of other teachers in RCE. In addition, the prospect that investors, rather than resisters, are more likely to engage in cross-case analysis is promising, and suggests that the integral role of RCE in this preservice education course had a significant impact on their reasoning.

We acknowledge several limitations of this study. We chose to categorize participants based on their level of RCE use during the course. There may have been other factors besides the level of RCE use that differentiated these students. For example, motivation to learn, prior experience with technology, available time outside of class, and writing ability may have contributed to the differences we identified in their papers. Nonetheless, even if our investors were excellent students, we were able to see how RCE specifically contributed to their learning. Second, we used course papers as a representation of student thinking. By focusing on the writing, we weighted students' ability to express their views in writing. However, interviews with some of the students suggested that their papers were good approximations of their views. Finally, in-depth analysis of more students would have allowed us to examine trends and variation among students within each category.

The next questions may be: To what extent does RCE redefine the teaching culture and future teaching practices? To what extent does this tool become enmeshed as part of these teachers' perceptions of their communities of practice (i.e., their cultural world)? Specifically, does the use of the tool transform these teachers' thinking and practices to an extent that they may, in turn, impact the larger "cultural world"?

One way we might assess such a qualitative change is to examine the extent to which teachers who use RCE impact the teaching culture within which they work. For example, by following preservice teachers from their exposure to RCE through their internship to their teaching positions, we may better understand the extent to which they have internalized various instructional practices and perspectives common in RCE. In addition, observing the manner in which such teachers function as "collaborating teachers" (in the future) would also inform us about possible recursive impact on the culture. However, as Sykes and Bird (1992) suggest, even after exploring cases and becoming reform-minded, if new teachers find themselves in a setting that does not support such reform practices, change may be unlikely. These inquiries, obviously, will require longitudinal studies.

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Appendix A: Paper Assignments

Assignment #1 (use of Reading Classroom Explorer optional)

Teachers struggle with how to organize their classrooms in a way that supports student learning. For example, educators debate whether whole class, small group, or independent work is most beneficial for student learning, and teachers must decide for themselves the set of organizational strategies they will use to accomplish their goals. Use the various information sources (e.g., observations, personal experiences, video, hypermedia, readings, etc.) encountered thus far to come to an informed opinion about classroom organization strategies and their impact on student learning. Communicate your views in a paper of approximately 500–1000 words in length. This assignment may be completed individually or in pairs.

Assignment #2 (use of Reading Classroom Explorer required)

For decades, educators have been discussing the benefits and disadvantages of skill-based and whole-language approaches to literacy. Using two or more classrooms, examine the role of literature, skill instruction, and students' prior knowledge in building a literacy program. Communicate your views in a paper of approximately 500–1000 words in length. This assignment may be completed individually or in pairs.

Assignment # 3 (use of Reading Classroom Explorer optional)

1. In your view, has the intellectual, socioeconomic, and ethnic/racial diversity in these classrooms affected the way these teachers approach teaching and learning? Explain.

2. Has viewing these videos (either in video or hypermedia format) changed your perspective on teaching reading and writing? Explain.

Communicate your views on these questions in a paper of approximately 500–1000 words in length. This assignment may be completed individually or in pairs.

Appendix B: Classification Scheme

I. Classifying Statements

Statements	Evidence	Source of Evidence
1. Claim 2. Interpretation 3. Summary or Synthesis 4. Question	1. None 2. General 3. Specific	1. Personal/CT 2. Video 3. Book 4. Class 5. Other

II. Classifying Arguments

A. Naked claims.

All Claims (AC); Claim-Summary (CS)

I would argue that the primary organization strategy in the classroom should be small group. The drawback to this strategy is that it requires the teacher to make the biggest investment "up front," and it is probably the strategy that the teacher is least used to using. Under this strategy, the teacher must work with the students in the beginning to establish a set of ground rules, responsibilities, and expectations in order to guide the students in their endeavors. (Jack, AC, Paper 1)

B. Claim with evidence.

Claim-Evidence (CE); Claim-Evidence-Summary (CES)

The teacher in the Hawaii classroom accessed students' previous experiences with caterpillars to assist in a guided reading exercise. Students wrote in their journals about what they knew about caterpillars before reading a book about a boy who learned about caterpillars. (Jessie & Nina, CE, Paper 2)

C. Claim with interpretation.

Claim-Evidence-Interpretation (CEI); Claim-Interpretation (CI)

In addition, this teacher uses literature to teach skill instruction. For example, in the video she is shown teaching story grammar during a writing lesson. The students write a story based on a story that she has read to them, and as they write she points out the need to incorporate characters, setting, conflict, and a solution in their story. In the voice-over, she explains that she knew the students needed and were ready for this lesson based on the types of stories they had been writing, stories that had characters but no apparent plot. This is a fascinating way of typing literature to skill instruction, because the emphasis is on helping students express themselves more effectively, not simply on learning skills. (Barbara, CEI, Paper 2)

D. All evidence. All-Evidence (AE)

The next classroom I visited was Danville where the students were performing prereading. She would review the long /e/ sound, using words that appeared in the story they were reading. She then extended the lesson to include word endings. She would hold up a piece of paper with the word "bee" on it. After the kids were familiar with the word, she would extend the paper to read "bees." This classroom appeared to be rich in literature. (Stella, AE, Paper 2)

About CIERA

The Center for the Improvement of Early Reading Achievement (CIERA) is the national center for research on early reading and represents a consortium of educators in five universities (University of Michigan, University of Virginia, and Michigan State University with University of Southern California and University of Minnesota), teacher educators, teachers, publishers of texts, tests, and technology, professional organizations, and schools and school districts across the United States. CIERA is supported under the Educational Research and Development Centers Program, PR/Award Number R305R70004, as administered by the Office of Educational Research and Improvement, U.S. Department of Education.

Mission. CIERA's mission is to improve the reading achievement of America's children by generating and disseminating theoretical, empirical, and practical solutions to persistent problems in the learning and teaching of beginning reading.

CIERA Research Model

The model that underlies CIERA's efforts acknowledges many influences on children's reading acquisition. The multiple influences on children's early reading acquisition can be represented in three successive layers, each yielding an area of inquiry of the CIERA scope of work. These three areas of inquiry each present a set of persistent problems in the learning and teaching of beginning reading:

CIERA INQUIRY 1
Readers and Texts

Characteristics of readers and texts and their relationship to early reading achievement. What are the characteristics of readers and texts that have the greatest influence on early success in reading? How can children's existing knowledge and classroom environments enhance the factors that make for success?

CIERA INQUIRY 2
Home and School

Home and school effects on early reading achievment. How do the contexts of homes, communities, classrooms, and schools support high levels of reading achievement among primary-level children? How can these contexts be enhanced to ensure high levels of reading achievement for all children?

CIERA INQUIRY 3
Policy and Profession

Policy and professional effects on early reading achievement. How can new teachers be initiated into the profession and experienced teachers be provided with the knowledge and dispositions to teach young children to read well? How do policies at all levels support or detract from providing all children with access to high levels of reading instruction?

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